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EXAMINER

VIGUSHIN, JOHN B

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 07/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,151

Applicant(s)

BOYLAN ET AL.

Examiner

John B. Vigushin

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. The Drawings filed on 25 September 2001 have been approved by the Official Draftsman.

Specification

2. The disclosure is objected to because of the following informalities:
On p.5, in the Summary of the Invention, line 5: "AC-to-DC inverter" should be changed to --AC-to-DC rectifier--. See Iversen et al. (US 6,384,492 B1), col.3: 52-53, for the evidence that supports the above-cited objection and recommended correction.
Appropriate correction is required.

Claim Objections

3. Claim 7 is objected to because of the following informalities:
"AC-to-DC inverter" should be changed to --AC-to-DC rectifier--. See Iversen et al. (US 6,384,492 B1), col.3: 52-53, for the evidence that supports the above-cited objection and recommended correction.
Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 2, 3 and 6-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "**the first set** of interconnects" in line 1 (bold emphasis by the Examiner). There is insufficient antecedent basis for this limitation in the claim. Also, is "**the first set**" referring to **all** of the "at least one first interconnect on the first surface," or, referring to only **a subset** of the "at least one first interconnect on the first surface?"

Claim 3 recites the limitation "**the second set** of interconnects" in line 1 (bold emphasis by the Examiner). There is insufficient antecedent basis for this limitation in the claim. Also, is "**the second set**" referring to **all** of the "at least one second interconnect on the second surface," or, referring to only **a subset** of the "at least one second interconnect on the second surface?"

Claims 6-8 depend from rejected Claim 2 and therefore inherit the defects of the claim.

Rejections Based On Prior Art

6. The following references were relied upon for the rejections hereinbelow:

Iversen et al. (US 6,384,492 B1) Patel et al. (US 6,366,467 B1)

McDonnal (US 5,075,821)

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

8. Claims 1-7, 9-11 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Patel et al.

As to Claim 1, Patel et al. discloses, in Fig. 5, an adapter (interposer) 506 comprising: a first (top) and a second (bottom) surface; first interconnects, i.e., the pads, not shown, on the first surface of adapter 506 that receive and electrically connect the BGA bumps of carrier 502 to adapter 506; second interconnects 508 on the second surface; since second interconnects 508 supply power to step down converter (SDC) 518 on carrier 502 (col.4: 66), then at least one connective path inherently exists

between the first and second interconnects; a signal modifying circuit (comprising input capacitor 522 and input inductor 524) between the first interconnects and second interconnects 508, as disclosed in an alternate case of the Fig. 5 embodiment wherein said input capacitor 522 and input inductor 524 are mounted on the adapter 506, as in the embodiment of Fig. 3 (Fig. 3 and col.3: 63-64; Fig. 5 and col.5: 14-15).

As to Claim 2 (as best understood by the Examiner in view of the above 35 USC § 112, 2nd paragraph rejection of the claim), Patel et al. further discloses that said first interconnects are physically spaced to correspond to a first pin configuration (i.e., BGA or PGA of carrier 502) of a power module, the power module comprising BGA carrier 502 and SDC 518 (Fig. 5; col.5: 6-8). Note that the BGA (ball grid array) of carrier (package) 502 is disclosed as a PGA (pin grid array) in an alternate embodiment (col.3: 40-42).

As to Claim 3 (as best understood by the Examiner in view of the above 35 USC § 112, 2nd paragraph rejection of the claim), Patel et al. further discloses that the second interconnects 508 are physically spaced to correspond to a second pin configuration of an end user's circuit board 516 by way of the circuit board socket 512 (Fig. 5; col.4: 64-66).

As to Claim 4, Patel et al. further discloses that a signal modifying circuit (i.e., input capacitor 522 and input inductor 524 mounted on adapter 506 in the alternative embodiment of Fig. 5, as indicated in col.5: 14-15) acts upon an input to the adapter 506 (just as in the embodiment of Fig. 3; col.3: 63-64).

As to Claim 5, Patel et al. further discloses that a signal modifying circuit (i.e., output capacitor 526 and output inductor 528 mounted on adapter 506; col.5: 11-12) acts upon an output to the adapter 506 (just as in the embodiment of Fig. 3; col.3: 64-65).

As to Claim 6, Patel et al. further discloses that the power module is a DC-to-DC converter (the DC power originates with a battery and a voltage regulator circuit provides a steady DC voltage having the correct amplitude; col.1: 11-16).

As to Claim 7, Patel et al. further discloses that the power module is an AC-to-DC rectifier (the DC power has been converted from AC power and a voltage regulator circuit provides a steady DC voltage having the correct amplitude; col.1: 11-16 and 29-32).

As to Claim 9, Patel et al. further discloses that, in the case where the first interconnects receive BGA bumps of the carrier 502 (col.3: 40-42), said first interconnects inherently comprise surface mount connects.

As to Claim 10, Patel et al. further discloses that, in the case where the first interconnects receive PGA pins of the carrier 502 (col.3: 40-42), said first interconnects inherently comprise through-hole connects.

As to Claim 11, Patel et al. further discloses that second interconnects 508 comprise surface mount connects since they mount adapter 506 to the top surface of user's circuit board 516 by way of a socket 512 on the circuit board 516.

As to Claim 13, Patel et al. further discloses that second interconnects 508 supply input power to the SDC 518 on carrier 502 (Fig. 5; col.4: 66) and that the input

capacitor 522 and input inductor 524 (col.5: 14-15) filter the input power from the second interconnects 508 (just as in the Fig. 3 embodiment; col.3: 63-64); therefore, the interconnects 508 form the input portion of the filter circuit that includes the input capacitor 522 and input conductor 524 and, accordingly, second interconnects 508 **comprise** a filter.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Patel et al. in view of Iversen et al.

I. Patel et al. discloses all the limitations of the claim including the power module comprising carrier 502 and converter 518 (col.5: 4-6), the power module disclosed as capable of DC-to-DC conversion or AC-to-DC rectification (col.1: 11-16). Patel et al. further discloses that the power module disclosed provides reduced parasitic inductance and resistance in high frequency and high current applications (col.2: 49-60).

II. Patel et al. does not teach a DC-to-AC inverter.

III. Iversen et al. discloses a power delivery system that, among other things, provides reduced parasitic inductance and resistance in high frequency and high current

applications (col.1: 47-56; col.4: 3-6), wherein the power delivery system may be any one of AC-to-AC and DC-to-DC converters, AC-to-DC rectifiers and DC-to-AC inverters (col.3: 47-54), depending on the requirements of the application.

IV. Since both Patel et al. and Iversen et al. both teach power delivery systems to a variety of high frequency and high current electrical and electronic applications, then the use of a DC-to-AC inverter power delivery system, taught by Iversen et al., for an application requiring AC power from a DC source would have been readily recognized in the power delivery system of the pertinent art of Patel et al.

V. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the power module of Patel et al. so that it delivers power as a DC-to-AC inverter for applications requiring AC power from a DC source, as taught by Iversen et al.

11. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Patel et al. in view of McDonnal.

I. Patel et al. discloses all the limitations of the claim and further teaches that second interconnects 508 supply power to a power module package, i.e., a DC-to-DC converter comprising the carrier 502 and the SDC 518 mounted thereon (Fig. 5; col.1: 11-13 and 21-24; col.3: 31-35).

II. Patel et al. does not teach that second interconnects 508 comprise an overvoltage protection device.

III. McDonnal discloses a DC-to-DC converter (Fig. 1) comprising an overvoltage protection device (circuit 80; col.4: 20-22) for the purpose of protecting the electrical system and the converter that provides the system power.

IV. Since McDonnal and Patel et al. both teach DC-to-DC converters for providing DC power to an electrical system, then the incorporation of an overvoltage circuit in the DC-to-DC converter would have been readily recognized in the pertinent art of Patel et al. as a vital feature ensuring the reliability and safety of the DC-to-DC converter and electronic system to which the converter supplies the DC power.

V. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate an overvoltage circuit in the power module package (i.e., the DC-to-DC converter) of Patel et al., as taught by McDonnal, in order to ensure the reliability and safety of the electronic system on adapter 506 and user circuit board 516 of Patel et al. Having thus established the incorporation of an overvoltage protection device in the power module package of Patel et al., and since the second interconnects 508 provide the input power to the power module package (col.4: 66 and col.5: 4-6), then second interconnects 508 inherently are a component of the input portion of the overvoltage protection device (i.e., circuit) of the power module and thereby **comprise** the overvoltage protection device.

Allowable Subject Matter

12. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

As to Claim 12, patentability resides in that *the second interconnects comprise through hole connects*, in combination with the other limitations of the claim.

14. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Vigushin whose telephone number is 703-308-1205. The examiner can normally be reached on 8:30AM-5:00PM Mo-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on 703-305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7382 for regular communications and 703-308-7382 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



John B. Vigushin
Examiner
Art Unit 2827

jbv
July 1, 2002